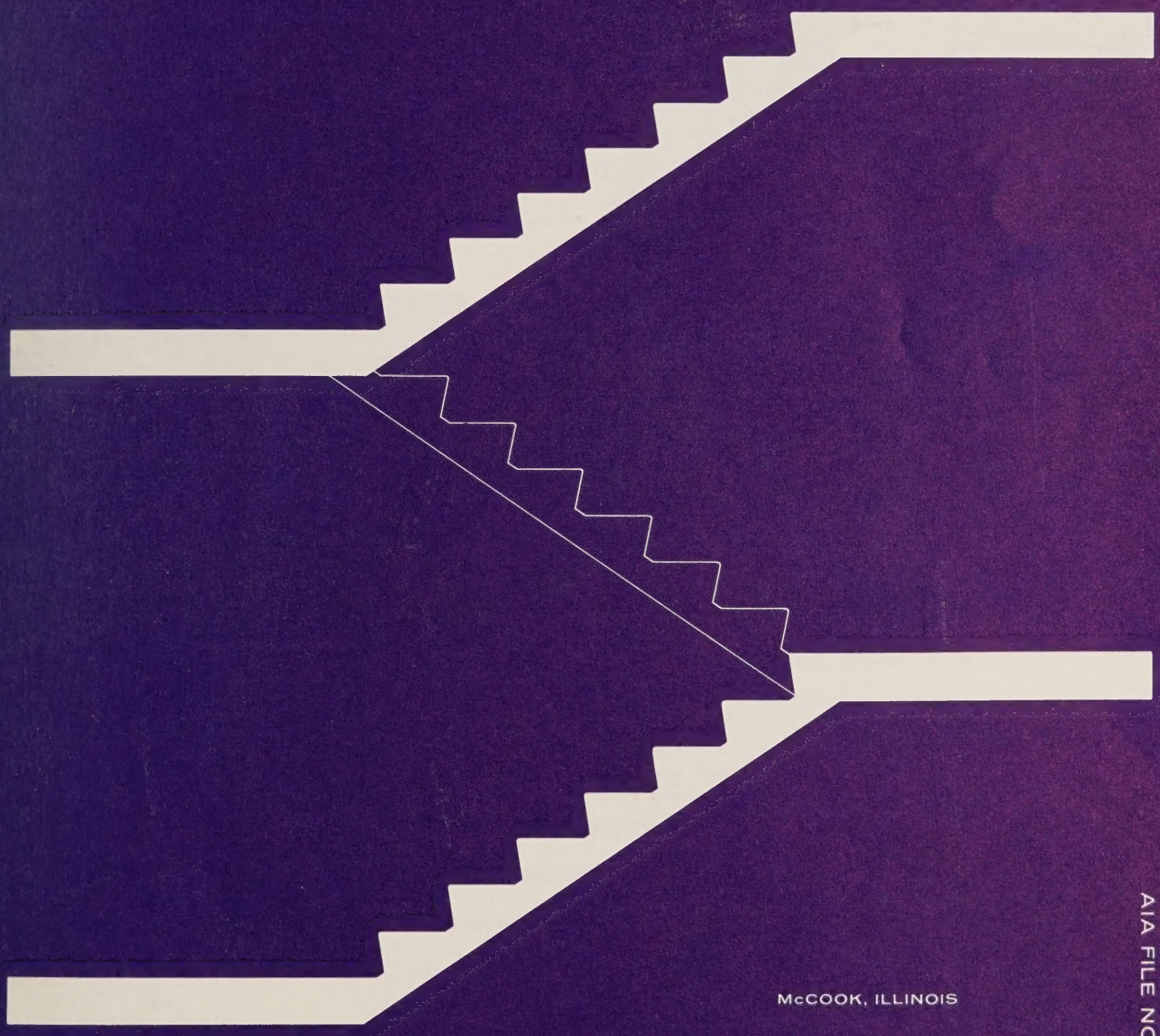
AIA FILE NO. 14-D

STAIRBUILDERS®

A Division of American Stair Corporation



McCOOK, ILLINOIS

AIA FILE NO. 14-D

A STAIRBUILDER UNIT IS

A prefabricated metal form for Reinforced Concrete Stairs, complete with metal riser fronts, reinforcing and temperature rods, plate, channel or exposed stringers.....
all welded into a rigid one piece unit.

ADVANTAGES

to the ARCHITECT

DESIGN UNLIMITED

No longer is the designer limited to the simple concrete stair or the metal pan stair with its compulsory channel stringers. The riser and stringer design may be varied to provide the proper aesthetic appearance.

NO ADDITIONAL FIELD SKILLS REQUIRED

Any deviation from the simple concrete stair has always been of questionable quality when regarding the field skills available. Factory fabrication of the intricate portion of the stair, whether simple or complicated, leaves only the simple soffit forming in the field.

ADVANTAGES OF CONCRETE

Although the designer may make many variations the stair as formed by Stairbuilders will become a concrete stair with all the silence and fireproof characteristics inherent in concrete construction.

ECONOMY

Elimination of outsized stair stringers, minimum material usage and simplified installation without plastering operations reflect lower initial costs.

to the CONTRACTOR

EARLIEST INSTALLATION

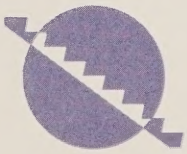
Stairs may be rapidly installed as soon as construction procedures will permit. They can follow pouring of the slab or be poured with the slab. Riser and nose are permanently protected, so that after finishing, the earliest possible access to upper floors by jobsite labor is available, without fear of damage to green concrete stairs.

MINIMUM FORMING SKILL REQUIRED

Risers, stringers and all reinforcing being rigidly and accurately welded into proper positions reduces the forming operations to a minimum. Only the soffit and possibly the sides of a standard unit may require the flat slab type of forming.

MINIMUM COSTS

An ultimate lowering of costs can be contemplated through minimum forming, absence of any patching operations and a speed-up of work progress by the availability of access to the entire jobsite by all workmen.



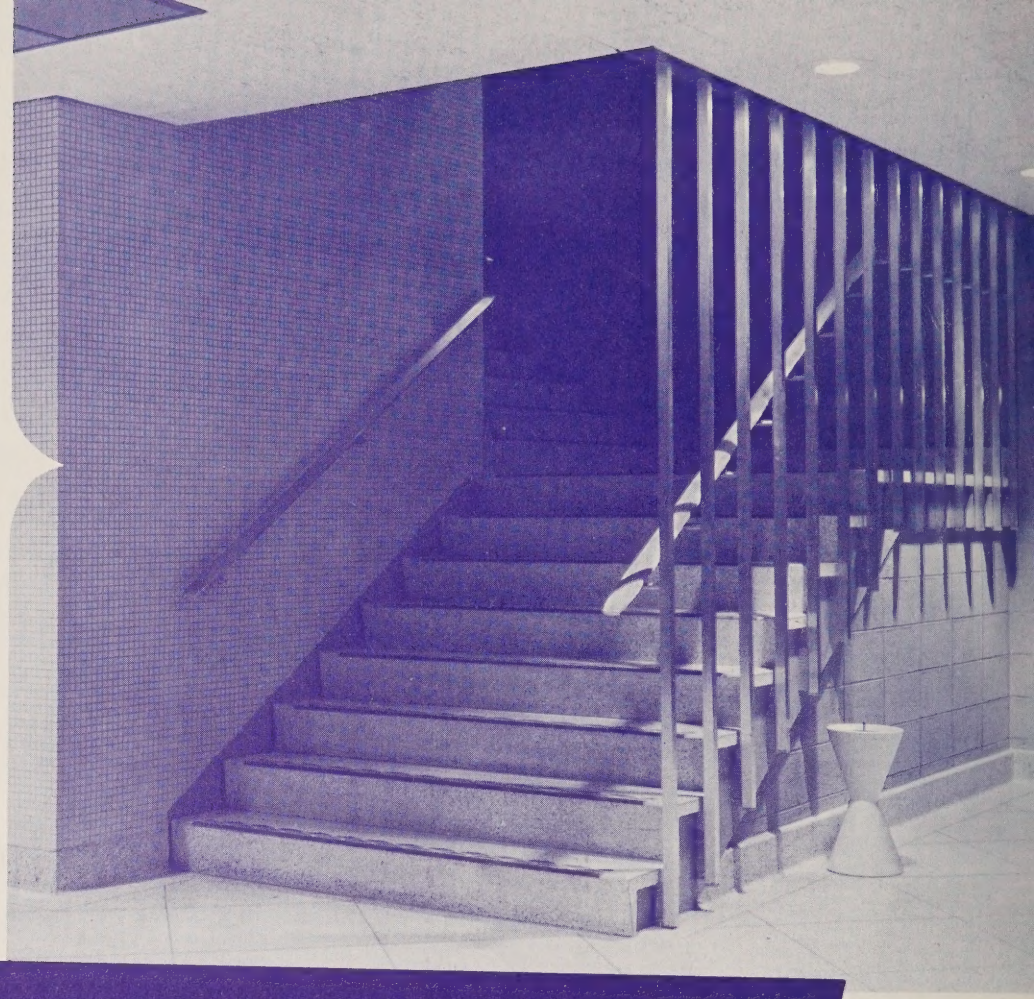
DENVER LAW CENTER

PROBLEM . . .

Develop a Stair which would protect a ceramic tile wall, accommodate precast Terrazzo risers and treads and provide an exposed stringer that would enhance the entire Stair.

SOLUTION . . .

A 3/16" stringer at the wall to give the maximum protection for the ceramic tile. Uniform riser and tread spacing to afford the proper base and security for the precast Terrazzo. A cut to contour, exposed steel stringer to furnish a uniform side appearance and eliminate any possibility of misforming on the jobsite.



VERSATILITY

AURORA HILTON INN

PROBLEM . . .

Construction of a Stair, in three sections that would easily match, requiring soffit forming only. The Stair risers and stringers to be curved and of an ornamental quality that would beautify a conspicuous portion of the Lobby.

SOLUTION . . .

The sides of the Stair had 3/16" steel plate stringers. The exposed stringer was rolled to the contour designed by the Architect. Risers were made of 3/16" steel plate and individually rolled to the different arcs required. Components were accurately welded together, forming the complete Stair, exactly as it would be used on the jobsite. The Stair was then marked and cut into three easily handled sections and reassembled on location with a minimum of forming.

LYNN FURNITURE COMPANY

PROBLEM . . .

Fabricate an ornamental Stair with treads of varying widths to accommodate poured Terrazzo. Stringers to be curved to create the impression of a graceful flair.

SOLUTION . . .

High quality 3/16" steel plate stringers were used on both sides of the Stair. The stringers were rolled to the desired configuration. Risers were inserted between the stringers and accurately welded to maintain true positioning and alignment. The concrete fill was brought to within 1½" of the finished tread, allowing for the final pouring of the Terrazzo finish.

OF DESIGN

THE TEMPO COMPANY BUILDING

PROBLEM . . .

Build a Stair which is lightweight in construction and appearance. A Stair having the maximum in safety features and the barest minimum of installation costs and cleaning maintenance.

SOLUTION . . .

A new type "V" riser was engineered to effect a cantilever type tread. This cantilever innovation decreases the amount of concrete normally required in a standard Stair. The side stringers, cut to the contour of the treads and rises, eliminated side forming. The units, when installed, not only appear lighter but actually have less dead weight than ordinary concrete Stairs. This type riser provides easy access to cleaning of tread surfaces.

RISER DESIGNS

STANDARD RISER TYPES

ADDITIONAL CONTOURS AVAILABLE

TYPE "A"

TYPE "B"

TYPE "C"

TYPE "D"

TYPE "V"

OPTIONAL NOSING DETAIL

Stairbuilder Risers have an exposed face of steel-like smoothness, straight edges, and dimensions that are constant and accurate.

The five basic designs shown at the left are the most popular by demand and consequently considered as standards.

Unless otherwise specified each Riser will have a nose protrusion and a 45 degree sanitary coving.

Risers under five feet in length are made of 14 gauge sheet steel. Risers beyond this length are made of 12 gauge sheet steel to provide a very rigid stair facing.

Type "A," "B" and "C"

Riser Types "A," "B," and "C" show the configurations most often used. Since each Stairbuilder Unit is fabricated to job requirements the standard Riser configurations can be altered as the Architect desires.

Type "D"

The Type "D" Riser, used when finishes of Marble or Terrazzo is desired on treads and facings, forms clean, straight edges for even support of these slabs. If a tread slab only is to be installed, the concrete tread behind the Riser can be recessed to receive the necessary grouting and permit the slab to lay directly on the Riser, to completely mask the grout.

Type "V"

The Type "V' has been developed to take maximum advantage of Stairbuilders unique forming method. The brackets which support the Risers provide the necessary reinforcing to permit the tread to be cantilevered. The "V" shape of the Riser eliminates a considerable amount of normal stair dead load. The stair slab can be designed for minimum thickness. The recessed Riser Face affords rapid and complete cleaning of the stair treads.

RISER DESIGN VARIATIONS

Actually, the variations in design are almost innumerable and depend mainly upon the whims of the designer, the desired architectural effect, or the specific job conditions.

Risers can also be made of other materials. Stainless steel, for example, is excellent for adding a rich appearance to a stair and for reducing the cost of stair maintenance.

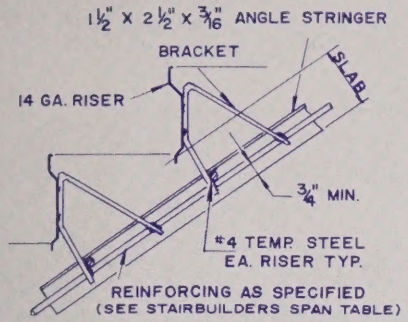
SAFETY NOSING

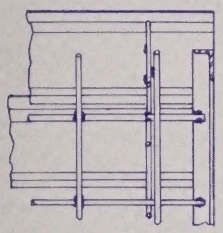
A Stairbuilder Unit can be furnished with any type of Safety Nosing. These Nosings are factory installed to guarantee the most secure mount and avoid any possibility of misapplication.

DESIGN PRECAUTIONS

It is important when designing a Stair, to investigate the limitations set forth in local building codes.

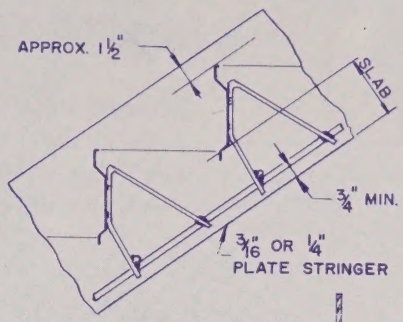
STAIRBUILDERS STAIR STRINGERS





ANGLE STRINGER

STANDARD STAIRBUILDER STAIR



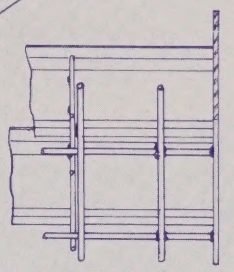
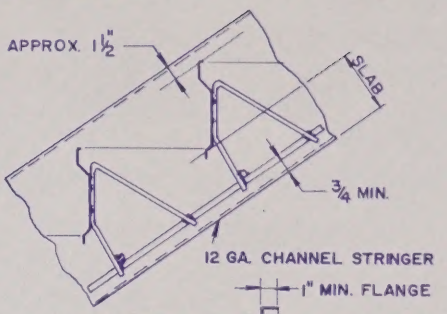
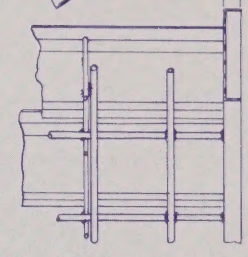
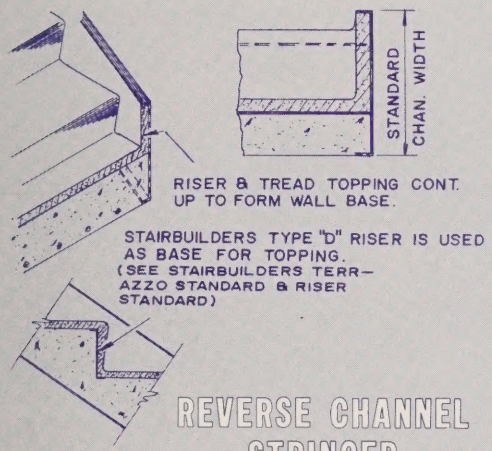


PLATE STRINGER

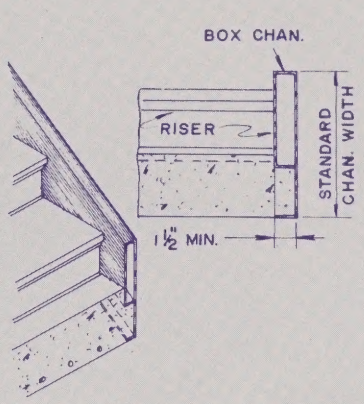




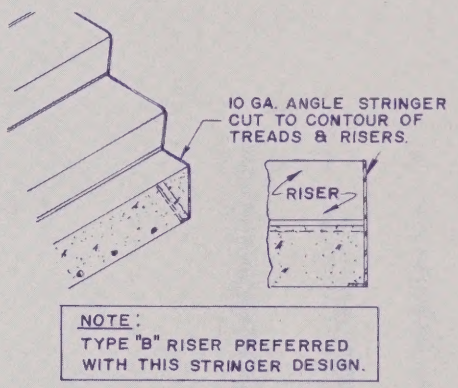
CHANNEL STRINGER


STANDARD CHAN. WIDTH
RISER & TREAD TOPPING CONT. UP TO FORM WALL BASE.
STAIRBUILDERS TYPE "D" RISER IS USED AS BASE FOR TOPPING. (SEE STAIRBUILDERS TERRAZZO STANDARD & RISER STANDARD)

REVERSE CHANNEL STRINGER



BOX CHANNEL STRINGER



CONTOUR ANGLE STRINGER

STRINGER DESIGNS

The end product of a Stairbuilder Unit is a concrete stair. Concrete stairs are self-supporting and are not dependent upon side stringers for structural support. Since the side Stringer need not be a structural member, it may be designed of the lightest material commensurate with the aesthetic and economic qualities desired.

STANDARD STRINGER

The most commonly used Stringer designs are of standard construction. A 2½" X 1½" X 3/16" steel angle is placed at the bottom corner of each side of the stair. This Stringer angle assures proper spacing of the reinforcing from the soffit and imparts the rigidity necessary to securely hold the wood side form.

PLATE STRINGER

The normal 3/16" Plate Stringer affords a smooth, exposed surface at low cost. The Stringer ends may be altered rapidly in the field to compensate for any adjustment in installation requirements. Thicker Plate Stringers can be furnished if the Architect believes that aesthetically it is necessary.

CHANNEL STRINGER

The 12 gauge formed Channel Stringer, normally used, furnishes all the aesthetic qualities of a heavier Channel and at less cost. This Channel Stringer is valuable as a straight plaster stop against a plastered wall. It can be formed to any flange and web dimensions or into a "Z" shape if required.

BOX CHANNEL STRINGER

This Stringer is formed of 12 gauge sheet steel in a manner that allows required welding to be done below the concrete surface. All corners and surfaces are smooth and uniform. With the Box Channel Stringer, the Architect may use any stringer width from 1½" up to 6" and take advantage of minimum weight and minimum cost.

CUT TO CONTOUR STRINGER

For those Architects who do not wish to have an exposed Concrete Stringer, but wish to show the contour of the Stair, a 10 gauge steel angle can be cut to the contour of the Stair. Excellent results have been obtained at lowest costs.

STANDARD STAIR STRUCTURAL SUPPORT METHODS

PREPOURED AND NOTCHED CONCRETE BEAM

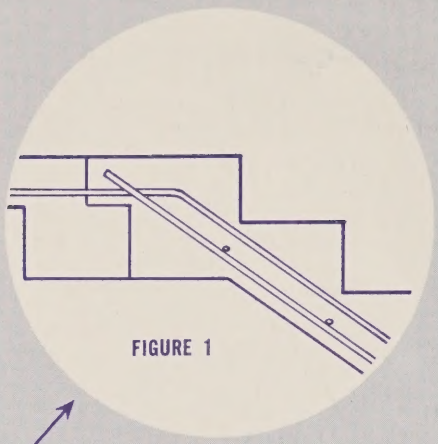


FIGURE 1

STAIR POURED WITH FLAT SLAB

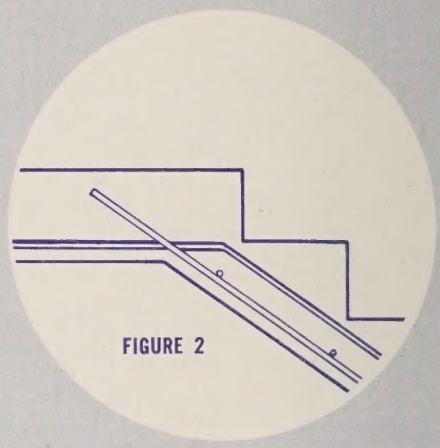
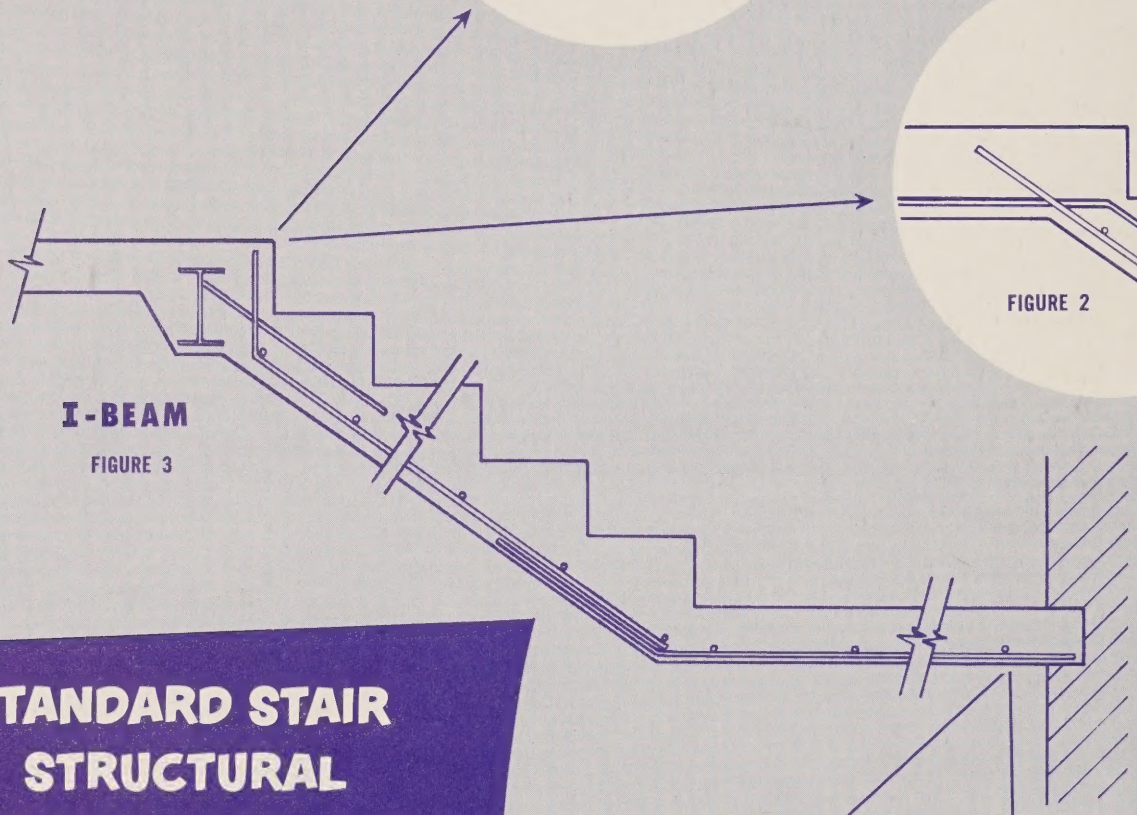


FIGURE 2

I-BEAM

FIGURE 3



WALL NOTCH

FIGURE 4

HANGERS FROM OVERHEAD BEAM

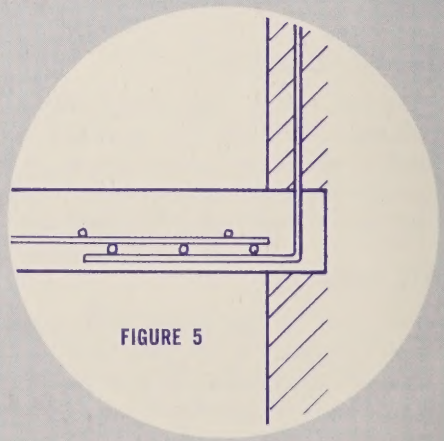


FIGURE 5

STRUCTURAL CHANNEL

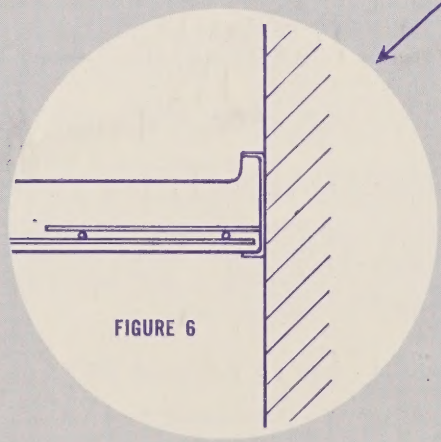


FIGURE 6

STAIR STRUCTURAL DESIGN

The singular function of a Stairbuilder Unit is to provide a stair form package with the desired aesthetic values, and yet, keep the structural design simple and flexible with a minimum amount of engineering time and effort.

DESIGN PROCEDURE

The basic design procedure is to determine what stair structural supports can best be fitted in with the surrounding building structure and then determine (with the Span Table) the stair structure necessary between the known fixed supports.

SUPPORTS

The six support methods shown on Page 8 have been found to be the most standard types in use. With little variation any of these can be adapted to 95% of all stair designs. In this respect, Stairbuilders has one essential requirement. When using a prepoured or preset beam as shown in Figures 1 and 3, there must be a minimum of 4" clearance between the riser and the outer extremities of the beam to permit proper support of the top riser.

SPAN TABLE

The Span Table at the right is a compilation of standard structural data simplified so that a glance by the Engineer will show the reinforcing and slab information necessary to design a stair supporting a 100 pound live load.

REINFORCING

Stairbuilders reinforcing rods, ASTM A15 and A305, are welded to temperature rods so as to maintain framework rigidity and fixed spacing accuracy even during the concrete pour. The 6" O.C. spacing shown in the Span Table is considered the most efficient spacing to work with, but does not eliminate other spacings if desired.

TEMPERATURE ROD

Stairbuilders unique design requires one temperature rod for each riser or approximately 12" O.C. Unless otherwise specified, standard ½" diameter steel rods, ASTM A15 and A305, are used. Additional temperature steel can be had by inserting intermediate rods between or increasing the size of the standard rods.

LANDING REINFORCING

Landing reinforcing can extend from and be an integral part of the stair reinforcing, or it can be spliced in after the form unit is in place. The latter method is highly recommended. It keeps the stair form package as short as possible to facilitate ease of jobsite handling. Standard splices have an overlap of from 20 to 40 times the rod diameter. Various methods of splicing are shown on Page 8 in Figures 2 and 4.

TIE-IN REINFORCING

Tie-ins between stair and supports are the same size reinforcing at twice the spacing; Example #5 @ 6" O.C.—Stair, #5 @ 12" O.C.—Tie-in. Tie-ins are welded to steel supports or anchored several feet into masonry supports and extend for the standard splice overlap with the stair rebar. See Figures 1, 3, & 6 on Page 8.

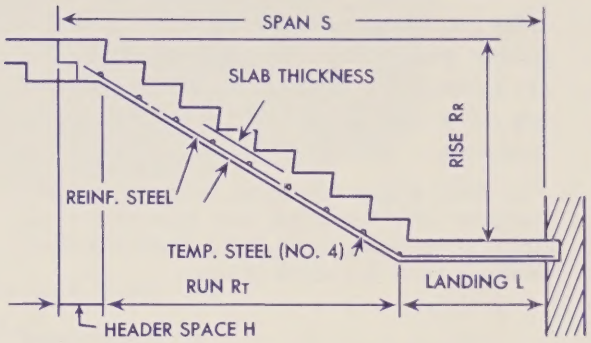
STRINGERS

The functions of a stringer are to provide the desired aesthetic appearance, to predetermine and set slab depth, and lend straight, sharp edges to the stair soffit. Although a stringer has strength, it is not considered a structural member under Stairbuilders standard design. This permits unlimited stringer design variation with the maximum in aesthetic values. However, to reduce dead load and lighten the overall stair design, the stringer can assume part of the structural load allowing for the use of thinner slabs. See Page 7 under Stairbuilders Standard Stringer Designs.

ENGINEERING CONSULTATION

All prefabricated Stair Units are designed and predrawn by Stairbuilders Engineering Staff. The entire Staff is always available for consultation on any design problem an Architect may have.

STRUCTURAL SPAN TABLE



1. Table values show minimum 100 lb. live load.
2. Only 6" reinforcing spacing is shown.
3. Example: (S = L + RT + H)
   Run = RT, Header space = H, Landing = L, Span = S.
   Assume:
   L = 3'-9", RT = 10 T. at 10" = 8'-4", H = 11".
   S = 3'-9" + 8'-4" + 11" = 13'-0".
   See table.
   Then slab = 5" Reinforcing = No. 6's on 6" ctr.
4. To increase live load, add 3" to the span for each 10 lb. increase in live load.
5. Decrease by subtracting 3" for each 10 lbs.

STEEL SIZE & SPACING	#4 8"	NO.4 6"O.C.			NO.5 6"O.C.			NO.6 6"O.C.			NO.7 6"O.C.		
SLAB THICKNESS	4"	3"	4"	5"	4"	5"	6"	5"	6"	7"	6"	7"	8"
LENGTH OF SPAN S = H + RT + L													
3'-0"													
4'-0"													
5'-0"													
6'-0"													
6'-6"													
7'-0"													
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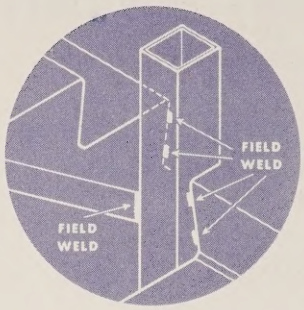
18'-0"													
18'-6"													

Although Span Table covers lengths to 18' 6", longer lengths are available. We suggest you consult our Engineering Department for specific details.

RAILINGS AND MOUNTINGS

The great versatility of the Stairbuilder stair form provides many methods of mounting rails securely and economically. Consequently a wide variety of new and/or novel rail designs can be considered for installation.

Our Railing Division manufactures Railings for use with Stairbuilder stair forms. Your local representative can furnish all necessary details if you should wish Stairbuilders to supply the required Railings.

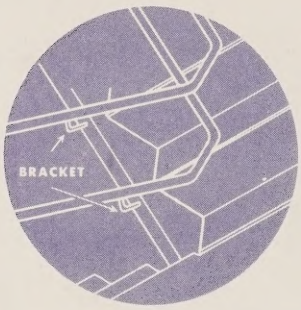


NEWEL POSTS

The square newel post commonly used with a metal pan stair is difficult to mount on the poured-in-place concrete stair. If a standard Stairbuilder form is used the newel may be securely welded to the stringer angle and riser plate eliminating any need for special mounting inserts.

PIPE POSTS

The pipe post normally requires an insert set in place when the concrete is poured. Quite often such inserts are placed improperly resulting in uneven post spacing. With the Stairbuilder stair form the pipe sleeves, where they occur between risers, can be shop welded in place to prevent field errors.

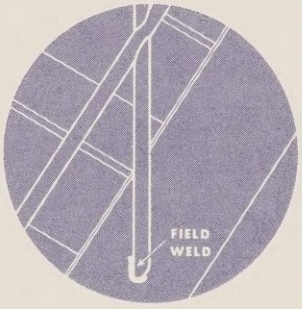


ELIMINATING POSTS

Even the most economical standard Stairbuilder stair form provides exposed metal at the side of the stair. Quite often expensive posts can be omitted through the welding of a bracket-like stud to side stringer, making an easily mounted, strong rail.

THE SIDE MOUNT

The plate stringer frequently used with the Stairbuilder stair form affords a smooth flat surface which can be tapped for screw mounting or for welding directly to the plate surface. This exterior side mount is very easy to install. It is free of obstructions that might hamper cleaning or maintaining the stair.



THE FLANGE MOUNT

A 12 gauge channel stringer may be provided which will give the effect of a metal pan stair and permit the mounting of rail in the same manner.

SPECIFICATIONS

Scope: Furnish and install for the stairs as shown on the architect's drawings, welded and prefabricated one piece stair forms as manufactured by Stairbuilders, a Division of American Stair Corporation, McCook, Illinois, or approved equal.

Materials: One piece stair forms shall consist of 14 gauge formed sheet steel risers ASTM A 7, riser brackets, reinforcing bars and $\frac{1}{2}$" temperature rods ASTM A 15 and A 305, together with landing reinforcing steel where indicated on the drawings, $2\frac{1}{2}$" x $1\frac{1}{2}$" x $\frac{3}{16}$" stringer angle, plates or channels as detailed by the architect, all factory welded together as one unit, to be of size and spacing necessary to provide a minimum of 100# live load per square foot.

Where shown, Stairbuilder's #300-3 Aluminum Safety nosing shall be firmly attached to the riser plates at the factory.

Fabrication: Stairs shall have uniform riser and tread spacing, all according to dimensions on architect's drawings. Reinforcing rods shall not sag or shift. All metal surfaces to be exposed in the finished stair shall have a shop coat of rust inhibitive paint applied at the factory.

Shop Drawings: Before any fabrication is begun, shop drawings shall be submitted to the architect for approval. In addition, the contractor shall verify job conditions and all dimensions.

Erection: Stair units shall be erected plumb, square and in proper alignment. Contractor to anchor forms securely and check dimensions before pouring concrete. Care shall be taken to obtain a clean and smooth finish on all exposed concrete surfaces of the finish stair through the use of plastic faced plywood or masonite.

Cleaning: Riser fronts shall be cleaned of excess mortar and given a finish coat of paint as specified.

ABBREVIATED SPECIFICATIONS

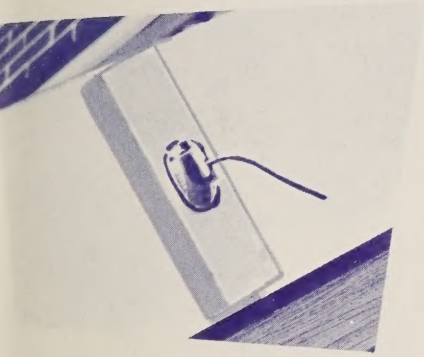
For reinforced concrete stairs as shown on the drawings, prefabricated forms similar to those manufactured by Stairbuilders, a Division of American Stair Corporation, McCook, Illinois, shall be used complete with reinforcing, riser fronts and necessary accessories. Design, fabrication and strength of finish stairs shall meet or exceed a 100# live load per square foot. Shop drawings shall be submitted for architect's approval before fabrication is begun.

NEW INSTALLATION CONCEPT

Time, material and labor can be saved if the Installer of the Stairbuilder stair form will take time to understand the revolutionary concept of this form and use it properly.

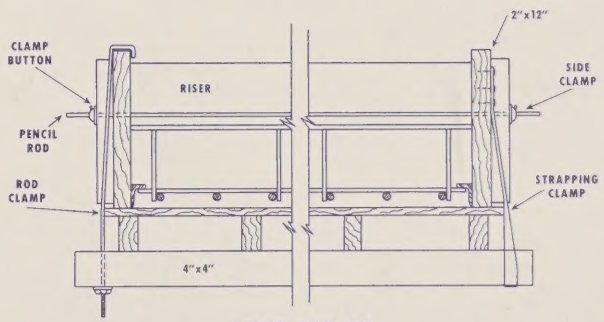
The Stairbuilder stair form not only eliminates the questions of tread width, riser height, slab thickness and reinforcing steel spacing, but provides a rigid composite unit with which you can . . .

Set the stair form in place before the stair soffit is in place and make adjustment to know exactly how it will fit before expending labor on the stair soffit.



Clamp the side boards in securely against the riser plates and stringer angle because you will not have to remove riser boards to trowel the riser face. Only the concrete treads need be trowelled and these are readily accessible.

Clamp the soffit to the side boards because the side boards are now holding up the stair form. The clamping of the side boards and soffit around the Stairbuilder unit provides a rigid wooden box form which takes a great deal of the concrete load.



CLAMPING SOFFIT FORM AND SIDE FORMS

Limit your shoring to "T" braces at four foot intervals which will help take the initial shock of the wet concrete.

ILLINOIS

HARRIS TRUST BANK BUILDING
Skidmore, Owings & Merrill
Turner Construction Company

PASSAVANT HOSPITAL
Schmidt, Garden & Erikson
Sumner Sollitt Company

LA SALLE JACKSON BUILDING
A. Epstein & Sons, Inc.
George A. Fuller

ROBERT TAYLOR HOMES
Shaw Metz & Associates
Gust K. Newberg Construction Co.

COLORADO

FIRST NATIONAL BANK BUILDING
Raymond Harry Ervin
Mead and Mount Construction Co.

IOWA

MEN'S DORMITORY
IOWA STATE TEACHERS COLLEGE
Brooks—Borg
W. A. Klinger, Inc.

MISSOURI

INTERNATIONAL BUSINESS MACHINES BUILDING
Hellmuth, Obata & Kassabaum
H. B. Deal & Company

GRAND FOREST APARTMENTS
Russell, Mullgardt, Schwarz & Van Hoefen
G. L. Tarlton Construction Co.

DELAWARE

UNIVERSITY OF DELAWARE DORMITORIES
Howell Lewis Shay & Associates
Frank H. Wilson Company

WISCONSIN

WISLAND CO-OP APARTMENT BUILDING
John J. Flad Associates
H. J. Findorff & Son, Inc.

AMERICAN AUTOMOBILE ASSOCIATION OFFICE BUILDING
Rasche, Schoeder, Spransy & Associates
Earl Millikin, Inc.

OKLAHOMA

SCHOOL HEADQUARTERS BUILDING WILL ROGERS FIELD
Hudgins, Thompson, Ball & Associates
Dennehy Construction Co.

NEW YORK

HOWARD JOHNSON MOTOR LODGE
Michael J. De Angelis
Harper Heights Construction Co.

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MICHIGAN STATE UNIVERSITY DORMITORY
R. R. Calder & Associates
Miller Davis Company

LAFAYETTE TOWERS II
Mies Van der Rohe
A. J. Etkin Construction Co.

FLORIDA

MIAMI HERALD BUILDING
Naess & Murphy
Gust K. Newberg Construction Co.

JACKSONVILLE CIVIC AUDITORIUM
Kemp, Bunch & Jackson
The Auchter Company

OHIO

DE PADUA HIGH SCHOOL
Stickle & Associates
R. S. Unspring Company

MARINA CITY APARTMENTS
Marina City Building Corporation
William L. McFetridge . . . President
Marina City Management Corporation
Charles R. Swibel . . . President
Bertrand Goldberg Associates . . . Architect
James McHugh Construction Company

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